NONLETHAL CONCEPTS

IMPLICATIONS FOR AIR FORCE INTELLIGENCE

Capt Edward P. O'Connell and 1st Lt John T. Dillaplain

Recently a new class of nonlethal weapons has garnered a considerable amount of interest in defense and law enforcement circles, resulting in the increased likelihood of the actual deployment of these new technologies at the operational level. The increased interest in the development of nonlethal means to achieve limited political, economic, and military objectives may require new considerations in how Air Force intelligence goes about its business of supporting the war fighter.

Emerging technologies supporting the development of nonlethal weapons are somewhat scattered, with many potential players. However, according to Don Henry, staff specialist in the Office of Tactical Warfare Programs, Under Secretary of Defense, Acquisition and Technology, Preliminary evaluations suggest that the use of non-lethal weapons, in either the more traditional conventional missions or the newer missions as suggested by operations other than war, seems more probable than possible.[1]

The term nonlethal has come into wide use despite the objections of many observers who claim that these weapons could result in lethality in some situations. A Rand study headed by Dr Gerald Frost used the term nonlethal concepts, defined as a system that can incapacitate an adversary's capability while attempting to prevent noncombatant injuries, friendly/adversary casualties, and collateral damage.[2] Of these technologies, many have potential air power applications.

Nonnuclear electromagnetic pulse (EMP) generators could potentially be fitted into air-launched cruise missiles. The nonnuclear EMP burst is produced by a conventional explosion that releases a microwave energy pulse that can damage or disable electrical components thousands of feet away.[3] These weapons could not only disable enemy weapons in the field but could also damage or functionally kill hardened,

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underground command, control, communications, computers, and intelligence nodes.[4]

Another promising technology is high-powered acoustic generators that are used to produce infrasound (below 20 hertz and inaudible). This low-frequency, high-decibel sound is emitted in bands that resonate in certain body cavities, causing the disturbance of body organs, visual blurring, and nausea. These effects, becoming more severe as the decibel level increases, range from temporary discomfort that disappears after a few minutes to permanent damage or lethality. Additional antimaterial effects include the embrittlement or fatigue of metals, thermal damage, and the delamination of composites.[5]

The Scientific Applications and Research Associates (SARA), Incorporated of Huntington Beach, California, is working on acoustic devices that can be attached to rotary-wing aircraft or inside penetrating munitions. SARA researchers see acoustic technology as meeting weapons requirements by being compact, rugged, transportable, and relatively cheap. The benefits of acoustic weapons include a tunable degree of effect, area denial, and propagation through precipitation, smoke, and dust.[6]

A brief rundown of other promising nonlethal technologies would include special chemicals, antitraction lubricants, and antipersonnel technologies. Optical munitions such as an isotropic radiator would be contained in a flare dispenser for the purpose of disabling infrared missiles instead of merely luring them away from an aircraft. Chemicals such as superacids, caustics, and embrittlement agents degrade certain materials, while antitraction lubricants make road surfaces inoperable. Antipersonnel technologies, perhaps more suited to law enforcement or special operations, include sticky foams, entanglement nets, volume confinement devices, calmative agents, flash devices, and rubber bullets.[7]

The USAF application of nonlethal concepts could cover a wide range of scenarios ranging from covert air insertion of special operations forces in an

antiterrorist operation to a broader application of air power in support of crises and lesser conflicts (CALC). The delivery of nonlethal weapons as a force multiplier in a major regional conflict (MRC) has the potential to become a common part of future warfare.

The driving factor behind the development of nonlethal concepts is the increasing emphasis on limiting casualties on both sides of a conflict. As we have witnessed in all US operations since Desert Storm, the emergence of the global media (i.e., the Cable News Network [CNN] factor has become a key consideration in conducting modern warfare. An illustration of this was the decision process leading to the cruise missile attack on the Iraqi intelligence headquarters. Before authorizing the attack, President Bill Clinton wanted to know precisely how many civilian casualties to expect. When Gen Colin Powell, chairman of the Joint Chiefs of Staff, gave him a probable number (12), the president approved the attack.[8] This shows that individual military operations are being scrutinized at the highest levels to determine the potential media fallout from civilian casualties. We can expect this to keep the collateral damage issue a key part of any future policy guidance from the national command authorities (NCA). As Alvin and Heidi Toffler noted in War and Anti-War, future wars are likely to be fought increasingly in the low- to mid-intensity conflict range.[9] These are precisely the type of conflicts where nonlethal applications could play a preeminent role. The more cautionary environment created by consensus-based coalition warfare and peacekeeping operations tends to make nonlethal concepts an attractive option for changing an enemy's behavior.

Nonlethal concepts, at least in terms of Air Force applications, do not appear to be a departure from the normal evolution of air power. Since the air campaigns of World War II, we have witnessed a steady improvement in the accuracy of our weapon systems as well as an increased specialization among both weapon platforms and the

ordnance that they deliver (fig. 1). The net effect of this evolution has been the ability to more effectively destroy critical targets while at the same time reducing collateral damage. The deployment of a wide array of nonlethal munitions in a future conflict will no doubt push us further down this continuum. Therefore, decision makers should understand that any movement toward a cleaner, safer war is a process whereby investment in more advanced munitions, weapon platforms, training, and intelligence is traded for fewer casualties, less collateral damage, and the neutralization of the CNN factor.

The situation presented to Gulf War planners by Iraqi MiG aircraft parked in front of the Iraqi Ziggurat temple during Desert Storm offers some insight into the potential benefits for the Air Force from nonlethal concepts. At that time, joint forces air component planners engaged in target development efforts against Iraqi air assets were confronted by the question of how to attack two Iraqi aircraft in the open yet parked proximate to one of Iraq's most significant cultural symbols.[10] Due to concerns raised about damage to the temple under the laws of armed conflict (LOAC), planners could not select it for force application. Precise geolocation and imagery (target development) existed on a valid target (aircraft in the open), yet because of the lack of suitable weapons, such as super caustics or embrittlement agents, the target could not be attacked safely within the stated guidance and objectives to limit damage to cultural, historical objects.

Implications for Air Force Intelligence

Recent Air Force intelligence efforts to better support the war fighter by refocusing systems and personnel forward at air operations centers will also better equip us to support nonlethal operations. Each of the Air Force missions described above, from CALCs to MRCs, will require the traditional level of support provided by the

intelligence community. However, some missions will require specially intelligence support to planners, operators, delivery platforms, and weapons. The intelligence community, along with weapon developers and operators, will have to determine the proper mix of information required to support nonlethal applications. Equally important, the community will have to learn how to translate nonlethal warfare objectives and guidance, potentially through a nontraditional target development and weaponeering process, to recommend courses of action that operators have to plan and then execute.

One potential way to examine the implications of nonlethal concepts on Air Force intelligence is to run the targeting process (including nonlethal concepts) through Rand's strategies-to-tasks framework (fig. 2).[11] In doing so, we observe that the current Air Force targeting process, coupled with existing collection resources, is not necessarily inadequate for the effective support of nonlethal concepts. Nevertheless, an increased demand for some tailored inputs may require some fine tuning of the process.

In Desert Storm, as we've seen, some targets were not attacked due to concerns over collateral damage. However, nonlethal concepts, once deployed as weapons, will give command decision makers more flexibility in the force-application stage, enabling them to service targets that would otherwise not be attacked. In a mid- or high-intensity conflict, the normal targeting process will provide a small number of residual targets that may require nonlethal ordnance. A low-intensity conflict or one-time limited strike may fall entirely into the nonlethal realm due to the interest from national decision makers. (Depending on the scale of conflict, command could reside at a specialized squadron's mission-planning cell, the intervention wing's operations center [WOC], or at the air operations center[AOC] supporting the joint forces air component commander [JFACC].) Intelligence officers must assist the planners in dividing the target set into lethal, nonlethal, and overlapping categories (fig. 3).[12]

The hub of intelligence support for nonlethal concepts will take place in the assessment cell located within the command infrastructure. In the future, the assessment of potential targets will change from a simple task to multidimensional work, involving the netting of interdisciplinary experts from varied nontraditional support fields (meteorology, physics, chemistry). Intelligence specialists such as targeteers, who have been trained to fuse all-source intelligence,are a potential unrealized resource for use in the assessment task of translating multisource information for nonlethal operations. Support for nonlethal concepts will require ready access to open-source information. Air Force intelligence systems specialists must establish information paths in peacetime to ensure easier access to this data in wartime. The difficulty is that such path clearing must be done in a low-profile, yet ultimately publicly known, manner. In the future, we can probably expect to access interactive databases that leave no footprints, giving us sources of targeting information that are currently untapped.[13]

With no current measures of effectiveness (MOE) for nonlethal concepts, intelligence analysts will help command planners establish MOEs for assessment and battle damage assessment (BDA) purposes by discussing alternative options with interdisciplinary experts, potentially over interactive video nets. An example of this would be the potential use of acoustic generators deployed in specially configured penetrating weapons. Planners might need to confer with weapon developers and geologists over video links in order to show them the underground command post they are targeting, and to seek their expertise in assessing the potential effectiveness of acoustic waves propagating through a particular rock formation or soil type.

The surveillance function will be tasked by intelligence analysts to provide more specialized imagery intelligence (IMINT) and signals intelligence (SIGINT) for damage assessment. One significant property of some of the potential nonlethal weapons will

be the onset time for the weapon to take effect. Figure 4 illustrates that we may have to wait several minutes or even hours for the effect to take place.[14] In order to record these nonlethal effects, the aircraft delivering the ordnance might be required to extend its loiter time, thus exposing itself to increased risk from enemy defenses. Tactical reconnaissance aircraft may be tasked for images timed to correspond to previous weapon effects; or if constant surveillance is required in a high-threat area, unmanned aerial vehicles (UAV) or remotely piloted vehicles (RPV) might be the best option. Some effects may only be discernible to personnel on the ground. For this reason, we can expect a greater role for human intelligence (HUMINT) in support of nonlethal concepts, with greater access coming from a system of classified fileservers, connecting us with data bases from coalition member countries, national agencies, and sister services.[15]

One part of the debate concerning the development of nonlethal weapons will be how to integrate them into operational units. In a broader context, as the weapons become more commonplace, they will eventually become another tool in the commander's toolbox[16] However, in the meantime, we may see a more limited distribution of these weapons. The use of nonlethal force in a peace enforcement scenario or limited raid may require the quick deployment of air power in the form of a specialized squadron. This further reinforces the new rule discussed in Michael Hammer and James Champy's Reengineering the Corporation personnel's (in this case, squadron intelligence officers') ability to send and receive information wherever they are.[17]

With a high learning curve initially encountered by all players in the nonlethal targeting process, mission preparation may become more problematic from a planning standpoint. As observed from studying recent peace enforcement efforts in Somalia, mission preparers and mission executors at lower levels could not afford the time for

HUMINT information requests to be approved and sent up channel without a negative effect on mission success. Case studies from the January 1993 Operation Southern Watch air attacks show that we have to move our notion of back-end planning up front so that information is more effectively communicated to the mission executor.18 With the potentially more diverse nature of nonlethal concepts, it will be even more important for personnel at the mission-preparation stage to reduce confusion and nonvalue-adding work by actively participating in back-end planning through direct interactive video systems when confronted with attacks against infrastructure or when performing detailed preplanned targeting. When mission planners are developing strikes against enemy forces, or considering more adaptive targeting problems such as those in Bosnia, they will need to provide in-time nonlethal-related intelligence to the operators.[19] The intelligence specialist at this level might require access to an information carousel comprised of different fileservers containing blocks of data (from the composition of metal found in Serbian artillery tubes to the current geolocation of each piece).

To support nonlethal operations, mission executors may be selected based on their added value to the BDA function. In the Desert Storm and Southern Watch operations, battle damage from F-16 and F-18 strikes using ordnance with proximity fuzes against Iraqi radars was not easily confirmed because of difficulty in analyzing imagery to establish frag damage to radar vans. This was compounded by these aircraft's lack of BDA sensors to confirm blast to the targets. Such controversies will only be exacerbated by the assessment of new MOEs for nonlethal operations in which theeffect may be the embrittlement of the metal or the slickness of a paved surface. Such devices as air- delivered incapacitating acoustic mechanisms make accurate battle damage assessment which relies on our current emphasis/mix of collection systems just as problematic.

In a new era marked by instantaneous global media reports (somewhat outside of our control), as well as the likelihood of more limited enforcement operations, targets may be selected with the criteria being ease of battle damage assessment. If Air Force intelligence does not have the requisite protocol and systems in place to assess nonlethal concepts, we may inadvertently contribute to a CINC's perception that use of air power may be prohibitive. In scenarios in which CINCs have been given strict guidance to limit casualties and collateral damage, they must have a good picture of what nonlethal force will entail and how the results will be verified. Otherwise, they will not accept the risks associated with its use.

Since the Gulf War, the gap between nonlethal technology development and intelligence capabilities required to support the command, mission preparation, and mission execution functions in figure 2 is closing rapidly. Though many nonlethal concepts are still in the development and early demonstration stages, intelligence systems specialists and communication engineers need to make sure that when they design information paths in the future, they consider all frictional impediments to the successful support of nonlethal concepts. Air Force Chief of Staff Merrill McPeak has summed up his thoughts on nonlethal technology:

We should address so-called non-lethal technologies, non-lethal in human terms but quite lethal in terms of killing systems or degrading capability. . . . I admit, this all sounds a little James Bondish; not something that should come from a guy who's spent lots of time thinking about putting fire and steel on target. But, I believe this is the kind of creative thinking we all must do.[20]

From an intelligence perspective, the Air Force is well suited to be a leader in the eventual employment of nonlethal weapons. As General McPeak emphasized, the time for creative thought is now, before these weapons become operational.

Notes

1. Don Henry, staff specialist, Office of Tactical Warfare Programs, Under Secretary of Defense, Acquisition and Technology, interview by authors, 2 August 1994.

2. Rand briefing, Brig Gen William S. Hinton, Jr., Air Combat Command, subject? Application of Nonlethal Weapons for Air Force Missions, June 1994.

3. ALCMs Given Non-lethal Role Aviation Week & Space Technology 138, no. 8 (22 February 1993)? 20 22.

4. Barbara Star,Proliferation? The New High Ground for USA Jane's Defence Weekly, 14 May 1994, 1.

5. Dr Gerald Frost and Dr Calvin Shipbaugh, GPS Targeting Methods for Non-Lethal Systems, Rand Publication RP-262 (Santa Monica, Calif.? Rand Corporation, 1 February 1994), 3.

6. John P. Dering, staff scientist, SARA Inc., interview by the authors at SARA Inc., Huntington Beach, Calif., 3 June 1994.

7. Frost and Shipbaugh, GPS Targeting Methods, 3.

8. National Affairs, Newsweek, 12 July 1993, 20.

9. Alvin Toffler and Heidi Toffler, War and Anti-War: Survival at the Dawn of the 21st Century (New York: Little, Brown, and Company, 1993), 56.

10. Then-Lt Col Dave Deptula, USAF, interview by Captain O'Connell at 33 TFW, Eglin AFB, Fla., 22 June 1992.

11. The model in figure 2 was created by the authors using Rand's strategies-to- tasks framework.

12. The graphic in figure 3 was developed in accordance with guidance from Maj Gen Kenneth Minihan, USAF, AIA/CC, 17 May 1994.

13. Bruce Don, Rand Corporation, National Information Infrastructure (NII) Task Force, interview by Captain O'Connell, 15 November 1993.

14. Frost and Shipbaugh,Application of Non-Lethal Weapons.

15. J-7 Joint Publication 2-0, Joint Doctrine for Intelligence Support to Operation, VII-6.

16. Briefing by authors, Maj Gen Ervin Rokke, USAF/IN, subject? Nonlethal Concepts? Implications for Air Force Intelligence, 7 June 1994.

17. Michael Hammer and James Champy, Reengineering the Corporation (New York? Harper Business, 1993), 96.

18. Rand briefing, Brig John Casciano, USAF/INX, subject? A Targeting Process for the Future? Implications of Case Studies, 6 October 1994.

19. Air Force Intelligence Modernization Plan (AFIMP), executive summary, 9 March 1994, edited by Capt YuLin Whitehead, AF/INXX.

20. Gen Merrill McPeak, Air Force chief of staff, Ensuring Technology Preeminence of U.S. Air and Space Forces, address, Scientists Group dinner, Andrews Air Force Base, Md., 5 January 1994.

Biographies

Capt Edward P. O'Connell (BS, University of Maryland; MS, Joint Military Intelligence College) is a research fellow representing the assistant chief of staff for intelligence, Headquarters USAF, at the Rand Corporation. During Operations Desert Shield and Desert Storm, he served as a target intelligence advisor at the Defense Intelligence Agency, led a mobile-missile-targeting initiative sponsored by J-2, and deployed on a CENTAF-sponsored damage-assessment team into Iraq. He recently served on the *USS Kennedy*, providing intelligence support for the initial airdrops into Bosnia. Captain O'Connell is a distinguished graduate of the Joint Military Intelligence College.

1st Lt John T. Dillaplain (BS, Texas A and M University) is chief of research support for the Air Force element at the Rand Corporation. He provides security authentication services for Project Air Force researchers and performs liaison functions between the Air Force and the Rand Corporation. This is his first assignment after completing the Intelligence Applications Officer Course at Goodfellow AFB, Texas.